1876MNRAS..36..347N

Observations of Venus. By Capt. W. Noble.

Having been in the habit, for many years past, of observing *Venus* in nearly every part of her orbit, with a very considerable range of powers, and under the most varying conditions of atmosphere and illumination; I was very much struck by Mr. Brett's announcement, at our last meeting, that he had detected unmistakable specular reflection from the body of that planet. Believing that, had this phenomenon been anything like so apparent as his very artistic drawing represented it to be, I *must* have seen it, I yet so far mistrusted my own considerable experience, as to admit the possibility that Mr. Brett's exquisitely-trained eye might have detected an appearance which had been previously overlooked by others less specially employed in regarding form, light, and shade, with a view to their reproduction. Since the 12th of last May, therefore, I have availed myself of every favourable opportunity to investigate this question of alleged specular reflection from *Venus*; but, I may as well say at once, with the most absolutely negative results.

My first step was to examine the planet, which I did in daylight, twilight, and at dusk, with various powers from 84 to 394, to see whether I could detect any indications of specular reflection by ordinary telescopic vision. I could discover none whatever; the whole of the light in the neighbourhood of the illuminated limb was as homogeneous as it possibly could be. I then, using a power of 255, interposed a graduated shade of dark glass; traversing it, with the utmost slowness, before the eye-lens of my eye-piece until the planet was rendered invisible. Under these circumstances the first part to fade away was (as might, *à priori*, have been expected) that in the neighbourhood of the terminator: and the effect presented was, of course, that of the material reduction of the breadth of the crescent. Then the actual cusps vanished; and, finally, the central part of the illuminated periphery of *Venus went out altogether*; not the slightest sign, trace, or indication of specular reflection—or of one part being in the smallest degree brighter than another—being visible. With a very dark green eye-glass too, of uniform tint, which extinguished the cusps, the light of the limb remained absolutely without difference of brightness of any description.

In addition to these observations, made and repeated on numerous occasions with my 4·2-in. Ross achromatic, I have examined the planet with the beautiful 6·25-in. Browning—with reflector belonging to my friend Mr. H. J. Slack, F.G.S., &c., employing his own wedge of dark glass for cutting off the light of the planet—and with precisely the same result. I can then only come to the conclusion that *Venus* does *not* exhibit anything whatever in the nature of specular reflection; and that its apparition, in Mr. Brett's case, must have had its origin either in his instrument or in his eye.

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It may not be uninteresting to add that, while my experiments were in progress, I discovered that, by waiting until the evening was dark enough, I could, with a power of 154 (or, in fact, any other—but this is the one with which I make the discovery) distinctly make a quasi-phosphorescent body of *Venus* out of the blue light resulting from the very slight over-correction of my object-glass. This "dark limb" was quite startling in its apparent objectivity; but, as pointed out by Mr. Green in his oral address at our April meeting, it vanished completely on hiding the illuminated crescent.

Forest Lodge, Maresfield,
1876, *May* 27.

Photometric Experiments upon the Light of Venus.

By John I. Plummer, Esq.

The planets *Venus* and *Jupiter*, it is well known, are frequently sufficiently bright when favourably situated to cast a well-defined shadow, but hitherto advantage has not been taken of this circumstance to determine the relative intensities of their light to that of the Full Moon, nor to compare it with any standard terrestrial source of light. The following experiments and observations have been attempted with a twofold purpose: First, to ascertain whether this troublesome problem might not be attacked successfully from a new point of view, so that estimates of relative brilliancy may be made in the simple manner I have to describe as reliable as those made with costly photometers; and secondly, to determine by observation alone the variations in the amount of light reflected from *Venus* towards the Earth at its various phases. As photometric comparisons are known to be liable to much error, and are necessarily affected by the peculiarities of vision of the observer, it may be thought desirable that they should be made not only in as many different ways, but by as many different persons as possible. This is my excuse for attempting a problem various portions of which have received the attention of Herschel, Bond, Zöllner, and still more particularly of Seidel. Moreover, *Venus*, owing to its close proximity to the Sun, has had less attention paid to it than any other, while its brightness is such that it is most suitable for the direct comparison of shadows.

The plan that I have adopted has been to compare the light of the planet with that of a standard sperm candle burning 120 grains of wax per hour, and to vary the distance of this until the shadow it casts upon a screen of white paper has an equal degree of intensity to that given by the planet. It being found impossible to get the two shadows upon the same screen, separate screens were arranged for each, and brought as near to each other as possible. The arrangement was therefore a modification of Rumford's photometer. The objects of which the shadows were

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